ORD/REGIONAL CUMULATIVE RISK ASSESSMENT WORKSHOP and EXPO

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Environmental Justice Considerations

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Chester, Pennsylvania Risk Study:

- The Chester risk assessment project was part of an initiative by the United States Environmental Protection Agency (USEPA) Region III and agencies of the Commonwealth of Pennsylvania to study environmental risks, health, and regulatory issues in the Chester, Pennsylvania area. This cumulative risk study utilized exposure data for all environmental media and exposure pathways, and attempted to characterize these exposures and to assess risk by qualitative and/or quantitative means.

Background

- The study began after a visit to the Regional Office by a concerned minister and several other residents from the community.
- Chester residents expressed their perception that the community was burdened by more than its "fair share" of environmental insults, including noise and air pollution and excessive truck traffic.
- Residents expressed concerns about the health effects of living and working amid toxic substances and complained of frequent illness.

In response to the Chester community concerns:

- Regional Administrator Peter Kostmayer committed EPA Region III to a major initiative involving two studies, addressing environmental regulatory and pollutant impacts/risk exposure issues.
- They include a "30-day" study of EPA's legal authority of existing and proposed plants; and a "180-day" cumulative risk assessment. As a result of the 30-Day Study, the Region targeted "stepped-up" enforcement actions and issued field citations to a number of underground storage tanks located in Chester and the nearby area of Marcus Hook

The City of Chester, PA:

- Is located approximately 15 miles southwest of the City of Philadelphia along the Delaware River
- At the time of the study, there were approximately 42,000 persons residing in Chester, which has an area of 4.8 square miles
- The City of Chester has among the highest concentration of industrial facilities in Pennsylvania. The City hosts a number of waste processing plants, a large infectious medical waste facility and two oil refineries. All solid waste from Delaware County is incinerated in Chester, and at least 85% of raw sewage and associated sludge is treated there.

The City of Chester, PA:

- Has a minority population of approximately 75% in a county that has a minority population of approximately 10%
- Has the highest unemployment rate in Delaware County
- Most of the housing in the City of Chester, PA was built before 1950.
- Chester has a large number of rental housing units.
- There is a shortage of medical care providers in Chester.

The City of Chester, PA:

- Many of the plants are located in close proximity to residential neighborhoods.
- A cluster of waste treatment facilities is located within 100 feet of Chester residences.
- Of municipalities in the state, Chester has the highest infant mortality rate, the lowest birth rate, the lowest infant birth weight and among the highest age-adjusted mortality and cancer incidence rates due to certain malignant tumors.
- A number of fishing advisories are posted along the Delaware River in Chester

After taking all of the information obtained through our scoping activities into consideration, it was decided that a multidisciplinary team of experts would be required to address all of the questions and concerns identified through the discussions. The Pennsylvania Department of Health was asked to participate in this assessment and they agreed to evaluate existing age-adjusted cancer mortality and cancer incidence data, and non-cancer disease mortality and incidence data for the City of Chester.

Study Design

- Data sources used for the study included existing environmental data for soils, sediment, surface water, groundwater, drinking water, air, fish tissue, children's blood leads, and health outcomes information
- Additional air and mobile source data was developed through the use of air modeling.

Study Design

- The Chester Risk assessment was designed to measure the exposures of community residents via all appropriate risk exposure pathways.
- All appropriate potential sources of exposure were evaluated including all facilities in the City of Chester and all sources that may have a potential impact upon the City (mobile sources, dry cleaners, gas stations, fugitive dust piles, etc.).

Study Design

- Standard default exposure parameters were used for calculating exposure point concentrations unless otherwise noted.
- Chemicals of concern and chemical concentrations and quantities were identified using existing analytical results, research into the work practices and process information of facilities, TRI data, facility size, facility production information, end-product information, toxicity information, historical data, and modeling data.

Study Design

- For air modeling the exposure point concentrations were calculated based upon information obtained regarding facility size, materials used, materials produced, stack height, production activity, etc.
- Receptors in the air modeling exercised were determined to be equally distributed across the City with exposures occurring in their breathing zones (adults and children).

Study Design

- Data from the two drinking water authorities servicing Chester was used to calculate risks associated with drinking water.
- Groundwater risk calculations were based upon groundwater data made available from previous investigations.
- Limited air monitoring data was available for use in the study.
- The exposure point concentrations calculated for dry cleaners and gas stations were based upon the size and activity of those facilities.

Considerations

- Due to the large number of per 1950 housing, the large number of rental units, and the large numbers of low-income residents living in Chester, an evaluation of children's blood lead levels was undertaken.
- All data results for venous blood lead testing of children under 7 years of age conducted in Chester between 1989 and 1993 were evaluated.

Considerations

- Assessment of truck traffic and the prolonged idling of of commercial trucks in the community
- Location and identification of private drinking water wells.
- Location and identification of waste piles around the City of Chester.
- Identification of sources of noise and odors.

Uncertainty and other issues

- Lack of current ambient data.
- Some existing data had not been collected for the purposes of conducting a risk assessment.
- Some data could not be quantitatively evaluated.
- Lack of toxicity values for some chemicals.

The findings of the study were:

- The blood levels of the children tested in Chester between 1989 and 1993 were unacceptably high, 67% of the 6783 children under the age of 7 tested had blood lead levels in excess of 10 ug/dl.
- Both cancer and non-cancer risks calculated exceeded levels that EPA believed to be acceptable.
- The health risk associated with the subsistence consumption of locally caught fish was unacceptably high.

Findings - Continued

- Age-adjusted cancer mortality rates for males in Chester were significantly elevated above those in the surrounding communities for the period of comparison (1987-1991).
- Cancer incidence rates for leukemia, all cancers combined, as well as cancers of the prostate, lung, trachea, and bronchus were significantly elevated above both the state average and the rates of the surrounding counties.

Findings - Continued

- Disease mortality ratios for Chester were generally higher than those in selected communities around the area (based on mortality rates).
- Cancer incidence rates for females were generally not elevated above those of females in the surrounding area (only cancer incidence rates for cancers of the lung, trachea, and bronchus showed elevations) .

Findings - Continued

- Drinking water was typical of other supplies throughout the country. A slight increase in long term risk is associated with the consumption of this drinking water due to water treatment.
- While most citizens consumed drinking water supplied by large public systems, a small number of private drinking water wells were identified during the investigation. Use of the private wells for drinking purposes may pose an unacceptable risk to those who consume that water (no one was found to use those wells for drinking).
- The waste piles identified by the residents were a source of fugitive dust emissions.

Findings - Continued

- Noise and odors were not found to be a major contributors to the risk as calculated in the study.
- Risks associated with the exposure to surface soils were generally found to be within acceptable limits.
- Risks associated with the consumption of groundwater were found to be unacceptable (groundwater in this area is not used for drinking purposes.).

Actions and Recommendations

- EPA and PADEP recommended an enhancement of the City's lead paint abatement, education and blood lead testing programs.
- Delaware County provided $400,000 for childhood lead poisoning programs in the City.
- CDC provided over $2,000,000 in funding for health monitoring and screening programs.
- PADEP provided an inspector to investigate odor and noise complaints.

Actions and Recommendations

- Waste piles were located and cleaned up with the assistance of VISTA volunteers.
- A voluntary emissions control program was recommended.
- Two workgroups were formed to address concerns in Chester (one of governmental stakeholders and the other made up of community stakeholder workgroup).
- Sources of air emissions which impacted areas with unacceptably high risks were recommended for further evaluation and investigation.
- New truck routes were established through the City.

Wish List

- Enhanced monitoring of facilities.
- Comprehensive public health/environmental health initiative.
- Evaluation of the “community model” in Chester.
- Use of public health indicators in the community assessment process.
- Better coordination between environmental health and public health agencies/professionals.